Date: June 4, 2018
To: House Energy Policy Committee Members
From: Ed Rivet, Executive Director, MCEF
RE: Dr. Wolfram Structural Separation White Paper

Attached please find the white paper written by Dr. Gary Wolfram, commissioned and published by the Michigan Conservative Energy Forum. We are providing you with this copy in anticipation of Dr. Wolfram's testimony before the House Energy Policy Committee on June 5, 2018.

There are many aspects of Michigan's electricity market that are impacted by the singular ownership of both generation capacity and the distribution network by utilities. The present debate about access to the grid for solar customers (HB 5861-5863) as well as fostering microgrids (HB 5865) are all a function of this combined ownership system.

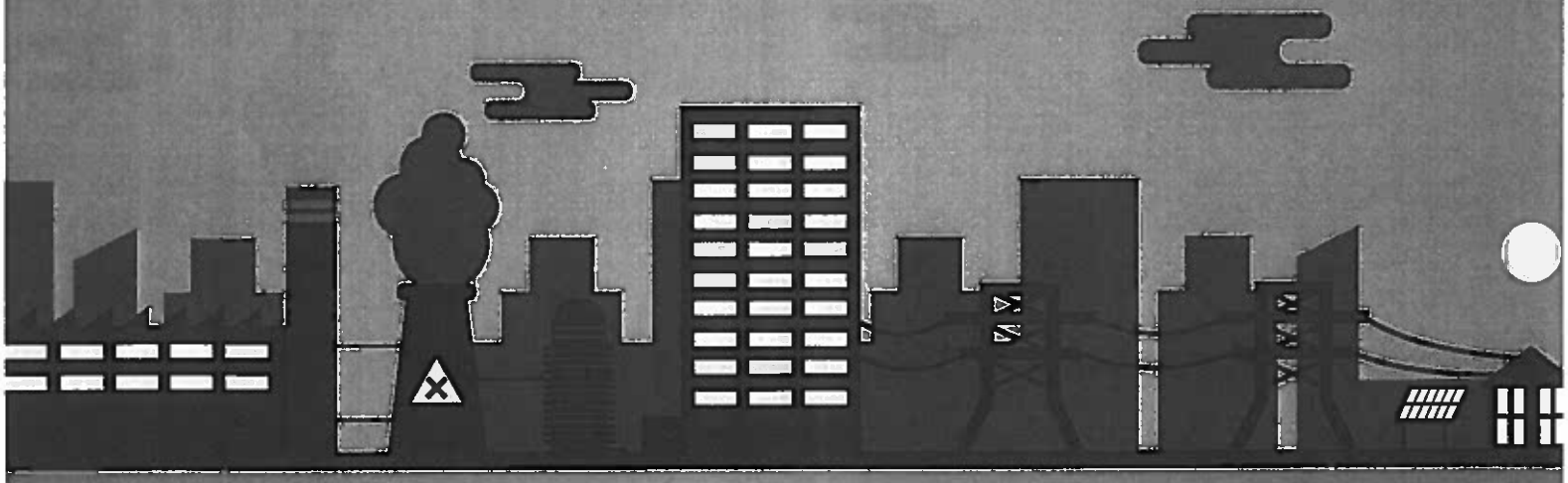
Important economic efficiencies and ratepayer advantages can be gained if the distribution of electricity is separated from the generation component. The benefits would be similar to those realized when transmission was separated from the system a quarter-century ago.

We hope you will find the information contained in Dr. Wolfram's paper most helpful as you deliberate on those policies affecting Michigan's energy future - a future we at the Michigan Conservative Energy Forum believe can be cleaner, more efficient, reliable and affordable.

OPEN-ACCESS POWER GENERATION:

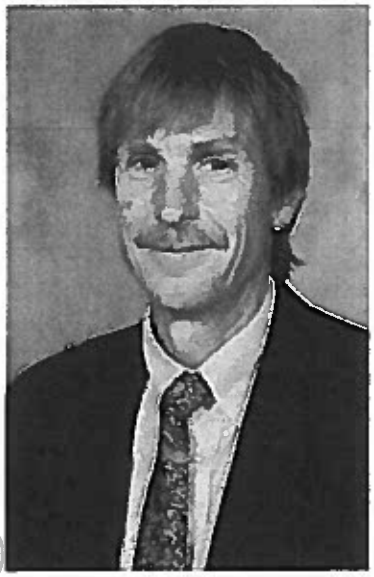
The Need for Structural Separation of Michigan's Electric Utility Industry

Gary Wolfram, Ph.D.



Hillsdale Policy Group, Ltd.

Specializing in Taxation & Public Policy Analysis

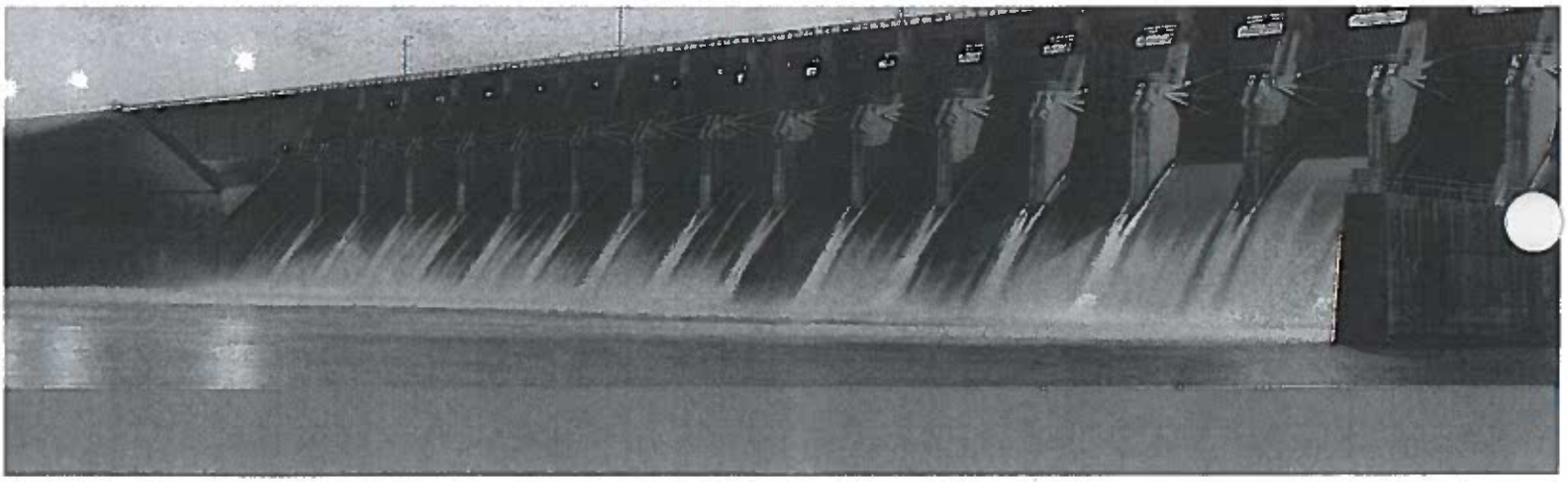


ABOUT THE AUTHOR:

Gary Wolfram is President of Hillsdale Policy Group, Ltd. and the William E. Simon Professor of Economics and Public Policy and the Director of Economics at Hillsdale College. He is the author of A Capitalist Manifesto: Understanding Market Economy and Defending Liberty, and has published numerous works on public policy issues. He has served in several policy positions, including Michigan's Deputy State Treasurer, member of the Michigan State Board of Education, President of the Board of Trustees of Lake Superior State University and Congressman Nick Smith's Washington Chief-of-Staff. Dr. Wolfram received his Ph.D. in Economics from the University of California at Berkeley and has taught at the University of California at Davis, Mount Holyoke College, Washington State University, and the University of Michigan at Dearborn.

Presented to:
Michigan Conservative Energy Forum
March 2018

MICHIGAN CONSERVATIVE ENERGY FORUM



INTRODUCTION

Both economic theory and experience have shown that market-based economies will lead to less costly production and more efficient pricing. Perhaps more importantly, they lead to increased innovation, which is the key to economic growth and an improved standard of living for all.

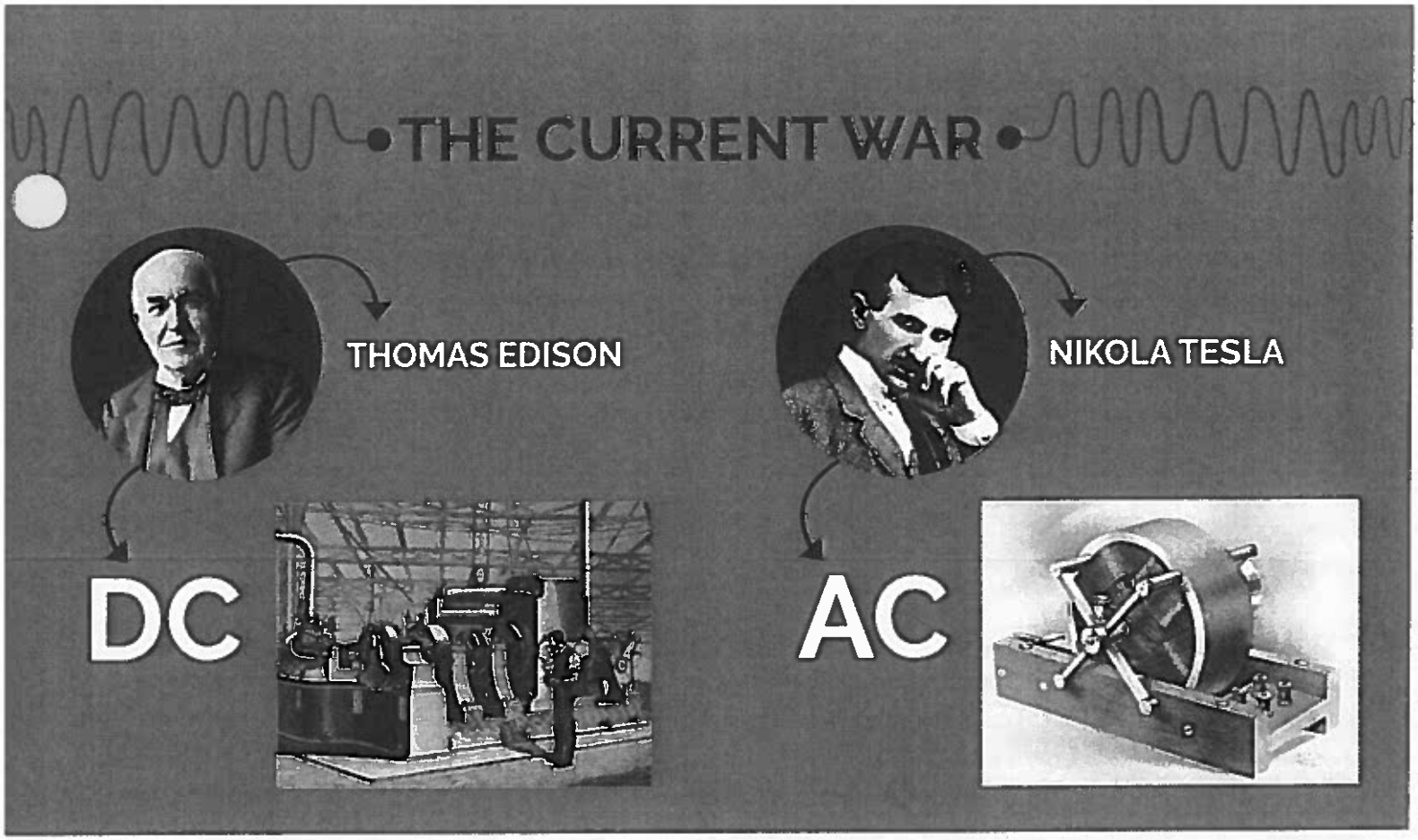
While most industries in the United States would meet the definition of a competitive market as discussed by Nobel Laureate Friedrich Hayek in his "The Meaning of Competition,"[1] there are some exceptions. One is the electric utility industry, which is an interesting case. It developed as a regulated monopoly and has only moved towards a competitive industry in the past few decades.

The purpose of this paper is to briefly analyze how the legislature might reduce electricity costs and stimulate innovation by improving the incentives of the electric utility industry in Michigan. This will require reducing the monopolistic features of the industry. A necessary aspect of this is what is known as structural separation - effectively separating the generation of electricity from its delivery to consumers.

Our electricity system is divided into three functions: generation, transmission, and distribution. **"Generation"** is the multiple forms of energy production facilities (coal and nuclear plants, wind turbines, hydro facilities, etc). **"Transmission"** is the movement of large amounts of high voltage electricity, often over great distances. It is the superhighway for electricity. **"Distribution"** is the process of scaling down the high voltage electricity from the transmission lines and distributing it to commercial, residential, and industrial customers. Together, these delivery mechanisms are what we refer to as **"the grid."**

Historically, utility companies have owned and controlled all three aspects of our energy system: generation, transmission, and distribution. The first step toward structural separation (also called "divestiture") already occurred when the ownership and operation of transmission was shifted from the utilities to separate entities. By going one step further and structurally separating generation and distribution from utility control, Michigan will be able to fully realize the benefits of competition and innovation.

Before discussing how this might be accomplished, it is useful to provide a summary of how the industry came to be considered a natural monopoly and to be regulated as such at both the state and federal levels.



BRIEF HISTORY OF EARLY ELECTRIC UTILITY INDUSTRY[2]

Thomas Edison built the first generating plant in New York City in 1882. The first generators used direct current technology. This corresponds to low voltage output. Because there is current loss as electricity is transmitted from the generator to the user along a transmission line, the direct current technology required that the generators be close to the end user. Thus, the industry began its development as a system of many small generators located within a mile or so of their customers.

In 1888, Nikola Tesla completed the design for a motor that could make use of alternating current in effectively generating electricity. The use of alternating current (and innovation in transformers) allowed electric voltages to be stepped up and down, thus allowing the system to transfer large amounts of power over long distances with much lower line losses than with direct current.

Samuel Insull took advantage of new generator technology and the use of alternating current to realize economies of scale, resulting in the consolidation of several small Illinois utility companies into one large company. The industry moved from one of small companies with low fixed costs and higher marginal costs to one that realized the large economies of scale that came with large plants with high fixed costs but lower marginal costs. Given the significant costs of establishing and maintaining the grid structure and the practicality of having only one set of power lines, the electric utility industry nationwide eventually became a system of regulated, vertically integrated monopolies, with each company owning the generation facilities, the transmission lines, and the distribution network.

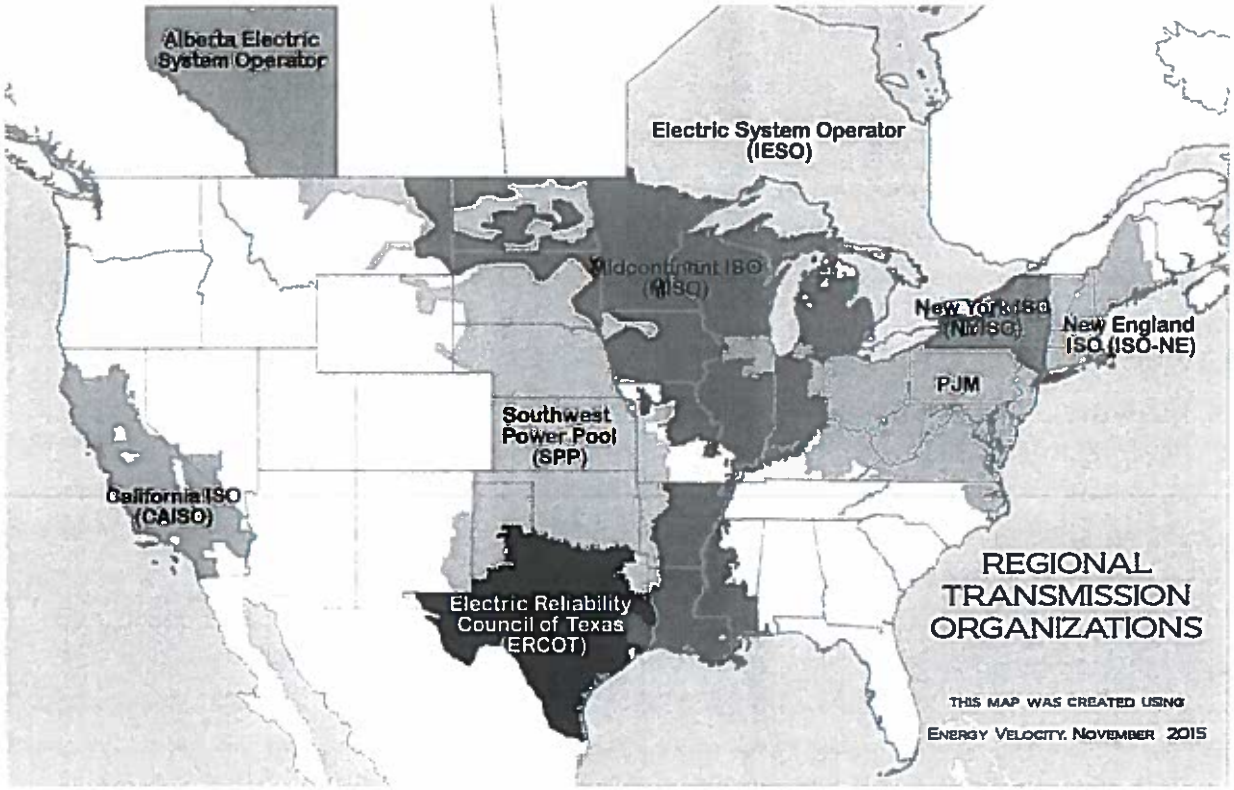
BRIEF HISTORY OF REGULATION[3]

Insull, in a noted 1898 speech, called for a regulated monopoly electric industry.[4] This became the prevalent view and early on electric utilities were regulated at the state level, beginning with Wisconsin and New York in 1907. By 1914, forty-five states had regulatory agencies overseeing the electric utility industry. Since the passage of the Federal Power Act of 1935, the federal government has been involved in regulating wholesale power sales and transmission of electricity. To encourage generation by smaller, renewable energy producers, Congress enacted the Public Utility Regulatory Acts of 1978 (PURPA). This Act required investor-owned utilities to purchase power from "qualified facilities" at the utilities' "avoided cost." Basically, a fair and competitive rate that opened the wholesale electricity market to competitors.

The theory of natural monopoly underwent substantial change in the 1970s, and by the end of the 20th century the federal government and some state governments began to lay the foundation for a more competitive electricity industry.

In 1992, the Energy Policy Act required the owners of transmission systems to transmit the electricity produced by third party generators, and authorized non-utility generators to sell their electricity to utilities at market prices. In 1996 the Federal Energy Regulatory Commission (FERC) issued orders 888 and 889 which further advanced the movement to a more competitive environment. These orders, among other things, required transmission owners to "functionally unbundle" and provide open and non-discriminatory access to the transmission lines, as well as open access to information about pricing for non-utility generators.[5]

In 1999, FERC Order 2000 called for the formation of Regional Transmission Organizations to oversee the maintenance and reliability of the transmission system. This served to enhance the ability to coordinate the activities of the independent system operators overseeing the transmission grid.



Source: Federal Energy Regulatory Commission, https://www.ferc.gov/industries/electric/indus-act/rto.asp

NEGATIVE INCENTIVES OF A REGULATED MONOPOLY

As I have noted in an earlier paper, there are a few incentive problems with an electric utility industry that is dominated by regulated monopolies.[6] The primary problems are that there is little incentive to:

1) reduce the cost of production

2) move demand for electricity to less costly times

3) innovate in the production of electricity, particularly to advance renewable energy technologies.

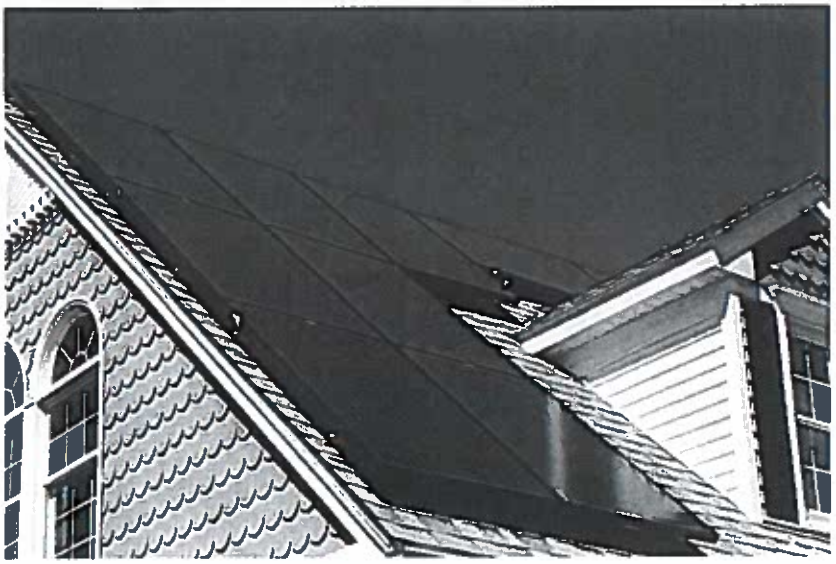
In the case where a company owns the ability to distribute electricity to consumers, owns the transmission lines, and generates electricity, there will be no incentive to allow other generators access to that company's customers. Indeed, there is every incentive to *deny* any competitors access to the transmission and distribution systems.

Suppose, for example, that Amazon was the only company that could deliver shoes to your house, and that it owned the roads that ran from shoe manufacturing plants to your house, and that it also manufactured shoes. Why would Amazon ever allow another shoe manufacturer to use Amazon's roads and delivery system to sell shoes to Amazon's customers?

This, of course, had been the case for decades with the development of the electric utility industry as a regulated monopoly. There was little incentive for an independent generator to find a way to produce electricity at lower cost, or to innovate in the generation and delivery of electricity, since it had little access to customers. This was a problem with regard to new technologies such as solar, wind, and other renewable sources of power.

Hayek argues that individuals and firms in competition with one another discover the most efficient means of producing goods and services, and competition among firms is a way for consumers to discover and obtain goods and services at the lowest price. Competition is also a force driving improvements and innovation in goods and services.[7] This process is hampered in a regulated monopoly industry.

In addition, since investor-owned utilities are allowed by state regulators to set rates that recoup their costs and provide a given rate of return, the greater these costs the larger the return to the utility. The incentive would be to build as large and costly a plant as the regulators would allow since net revenues will be larger the costlier the plant.



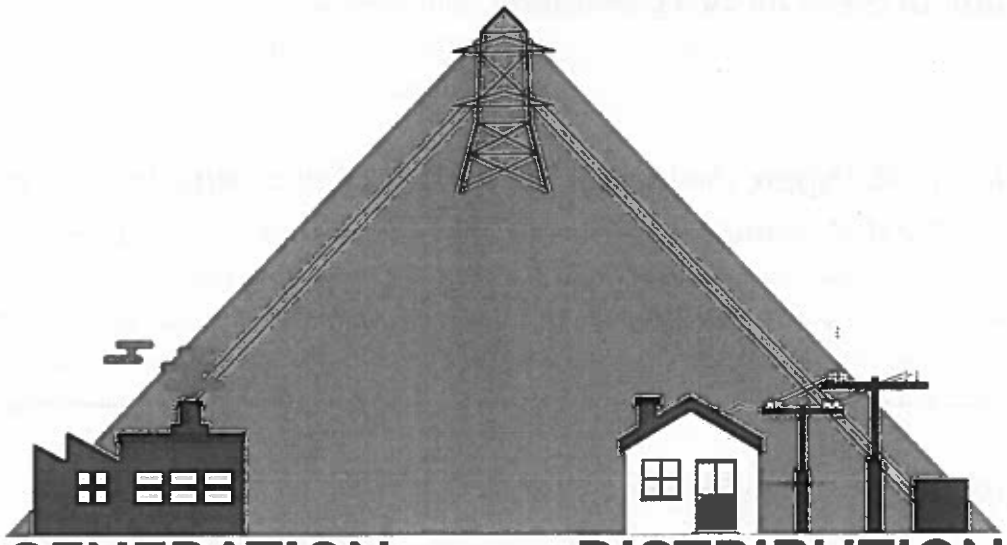
This situation is aggravated by the fact that ***utilities have more information about the costs of generating and delivering electricity than does the body that regulates them.*** This leads to the general situation that Nobel Laureate George Stigler termed "regulatory capture."[8] The regulated firms have the incentive and ability to influence what regulations take place and use the regulatory process to their advantage.

When utilities are allowed to charge rates that give them a fixed return on their investment in generating facilities, there is also no incentive to undertake efforts to reduce peak load consumption, such as adopting a pricing structure with higher prices at peak load times. The greater the peak load the greater the size of the generating facility, and the greater the revenue to the utility.

The same problem occurs with programs designed to offer energy efficiency to customers. If these programs are very effective there will be less need for the utility's generation and therefore the utility will earn less profit. Similarly, since self-generated power, such as consumer-installed solar panels, reduces both the demand for the regulated utility's product and its return, then we would expect the utility to oppose innovations that would decrease the cost of self-generation.[9]

> *Adam Smith noted that we do not rely on the benevolence of the butcher, the baker, or the brewer for our dinner, but rather on their self-interest.[10] Now he didn't say one would never find a benevolent brewer, but a system that relied on finding them would be much less capable of producing a prosperous society. In this case, one can probably find the equivalent of the benevolent butcher—the monopoly that for various reasons may be highly concerned with reducing costs and innovating in production—but relying on such benevolent companies will not result in a highly functional electricity industry.*

TRANSMISSION



OVERCOMING THE PROBLEMS OF A REGULATED MONOPOLY

A competitive electric utility industry would overcome many of these hurdles to cost efficiency and innovation in the provision of electricity. Using our shoe example from above, if anyone could deliver to your house, could drive on the road at the same cost, and produce shoes, then we would expect shoe manufacturers to develop new types of shoes, reduce the cost of making shoes, and find cheaper ways to deliver shoes to capture your business. Similarly, if any firm could generate electricity, transmit it to your house and retail it to you, then we would expect to see innovation in the production, transmission, and delivery of electricity.

As technological advances made it clear that a competitive market for electricity was possible, the question of how best to accomplish this rose to the forefront. As noted above, FERC and Congress recognized that ***a competitive market requires the separation of at least transmission from generation.*** FERC stated in its 1999 Order 2000, referring to Order 888, "In 1996 the Commission put in place the foundation necessary for competitive wholesale power markets in this country—open access transmission."[11]

Michigan went beyond functional unbundling of transmission with the passage in 2000 of Public Act 141, which required, among other things, that investor-owned utilities fully divest their transmission facilities or join a multistate regional transmission organization approved by FERC.[12] With the passage of the Act, both Detroit Edison's and Consumers Energy's (Michigan's two largest regulated investor-owned utilities) transmission lines eventually came to be owned by ITC Holdings. ITC Holdings is the largest independent electricity transmission company in the country and owns much of the grid in Michigan's Lower Peninsula.[13]

Separating transmission from distribution effectively created some competition in the state's wholesale electricity market. Independent generators had access to the transmission lines at rates equal to that of the regulated utility's generating facility, with the result that if an independent generator could produce electricity cheaply enough an investor-owned utility that owned the distribution system might purchase the electricity from the independent generator.

However, since the distributor also owns the generation, there remains strong incentives for that distributor to prefer its own generation, particularly when it has large facilities with high fixed costs. If the retail customer does not have choice among generators, then the distributor will likely prefer its own generation even if independent generators can produce at lower costs.

Under current law in Michigan, the largest generators of electricity, the investor-owned utilities, also own the distribution system. Most of the electricity in Michigan is generated and sold by investor-owned utilities. The major ones are Detroit Edison (DTE) and Consumers Energy, which together have more than 90% of the investor-owned sales in Michigan and 87% of the total market, with producers like municipally-owned utilities making up the full market.[14] While transmission has been effectively separated from generation and distribution through the actions of FERC, utilities are still both generators and distributors of electricity in Michigan.

THE NEED FOR STRUCTURAL SEPARATION

Innovation is the key to economic prosperity.[15] Imagine a world without electricity. Access to electricity has changed the lives of people all over the world. Improving the electric grid and providing new methods of producing electricity will be beneficial to all, but particularly to the lower and middle class.

However, all innovation is risk-taking by definition. If it is truly innovative, others have not done it before, so we cannot be sure that people will be willing to pay as much as the cost of discovery, production, and marketing. The obvious question an economist, or anyone else for that matter, would ask is: ***Why should I undertake the costs of inventing a new way of delivering clean and renewable energy if I don't have access to customers?*** The answer is also obvious. You may get the equivalent of Belle's father in the Disney movie, *Beauty and the Beast*, who just likes to tinker, but surely that is not the road to an innovative electric utility industry.

Innovation in the generation of electricity is likely to assist in what is known as load diversity. Load diversity is using non-peak generation in one region to supply peak-load generation in another region. Innovations in solar power generation, particularly at the utility-scale, would allow for smaller peak-load generating capacity and thus lower rates while maintaining grid integrity.

The only way to achieve systematic innovation in the utility industry is to separate the distribution of electricity from the generation. As FERC noted decades ago, open access is the key to an efficient system. FERC focused on the separation of transmission from generation and distribution. It could regulate this because transmission crosses state lines. The FERC Orders 888 and 889 effectively separated the transmission function and as a result we now have a system by which wholesale generators have equal access to the transmission system. The next step is to separate the generation from the distribution of electricity.

Christensen Associates noted in a 2016 study: "retail choice requires functional unbundling of utilities' generation function (and perhaps customer service function) from its distribution and transmission functions. Virtually all states that implemented retail choice required vertically integrated utilities to undertake such separation."[16]

If you allow for retail choice without separating generation from distribution, then the distribution side of the utility can charge higher rates to subsidize the generation side of the company. Utilities will illegitimately shift generation costs to the distribution side of the customers' billing. This cost shifting allows the utility to underprice competing generators, defeating the purpose of retail choice.

In addition, if residential customers are less likely to be aware of the ability to choose the company generating the electricity than are industrial or commercial customers, or if the elasticity of demand is greater for industrial and commercial customers, then the distribution side of the utility has an incentive to charge residential customers more for distribution to subsidize generation costs to the industrial and commercial customers.

There is no disincentive for the owner of the distribution network to discriminate among generators when retail distribution is separated from generation. The firm that owns the distribution will charge the retail customer the cost of distributing. Indeed, it is possible that the distributing firm will have an incentive to expand the distribution network or innovate in the methods of distributing electricity to capture the difference between the cost of distribution and the price received.

Once generators have direct access to customers, then we would expect more innovation in the generation of electric power. This will happen since independent generators that can produce electricity at low cost will be able to earn profit and expand their customer base. ***Thus, the next step, in Michigan at least, is to separate distribution from generation, thereby creating an "open access" market for the production of electricity.***

OUTLINE OF MICHIGAN'S ATTEMPTS TO RESTRUCTURE

In 2000, Michigan attempted to move to retail competition with PA 141, which allowed retail customers to choose their provider of electricity. As noted below, a paper by Theodore Bolema found this met with success in reducing electricity rates in Michigan relative to its regional counterparts.

However, in 2008 the passage of PA 286 restricted the loss of the customer base for Consumers Energy and DTE to 10 percent. This placed a severe limitation on the ability of competitive generators of electricity to obtain access to customers.

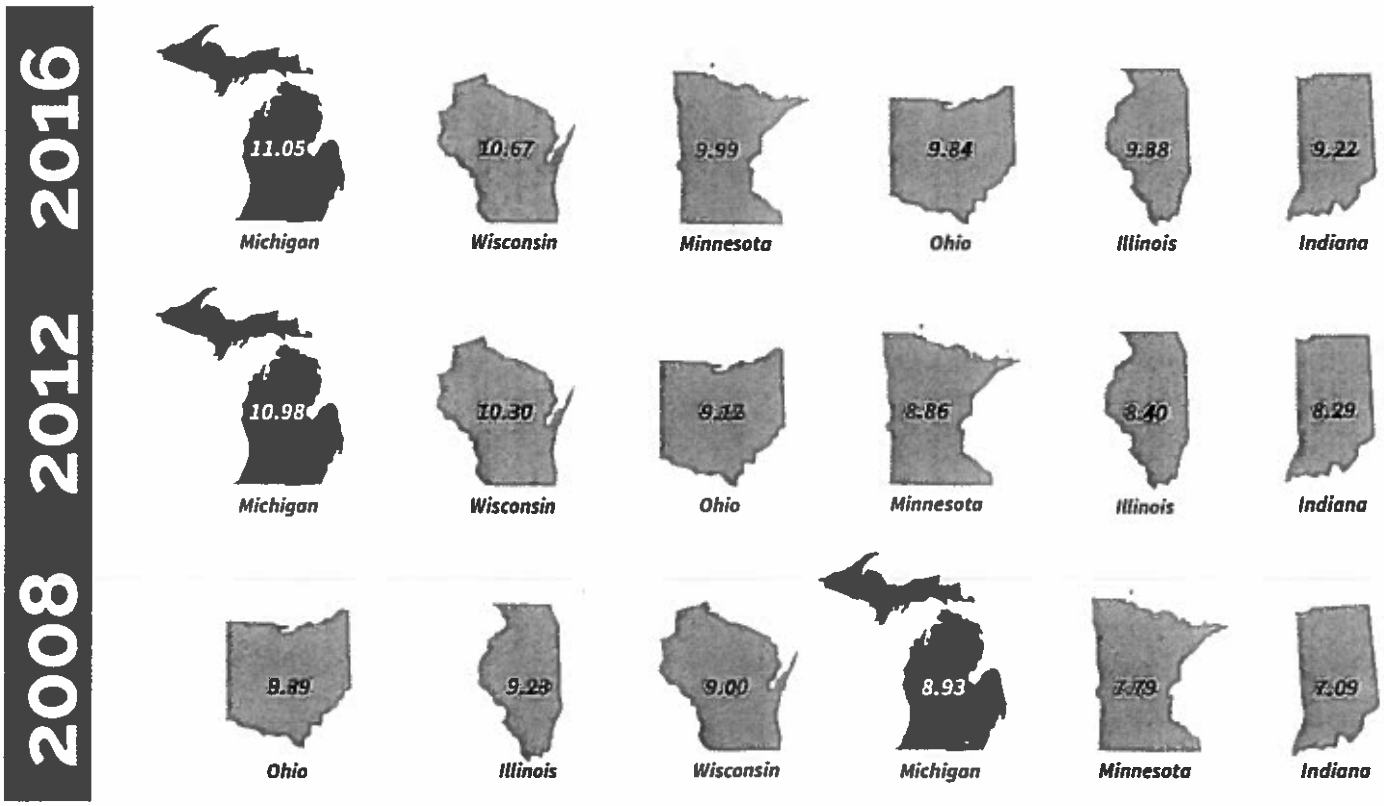
PA 295 of 2008 required 10 percent of electricity to be generated by renewable resources by 2015, and importantly required that at least half of this generation be purchased from independent power producers. This provision gave independent producers of renewable energy access to customers and, by providing an incentive to innovate and increase efficiency, likely had a positive effect on bringing down the cost of renewable energy. Unfortunately, recent legislation, PA 342 of 2016, removed the 50% requirement and thereby reduced the ability of independent producers to access customers.[17]

In my earlier paper, Improving Michigan's Electric Utility Industry, I pointed out that Michigan's retail electricity rates are substantially higher than its competitor states. This continues to be the case (see table 1 on page 10 comparing the regional average retail prices of electricity). It should be clear that changes in the structure of the industry will be a benefit to Michigan's consumers of electricity.

AVERAGE RETAIL PRICE IN CENTS PER KILOWATT HOUR

Source: Energy Information Administration, 2016 (latest data available)

Table 1



RESTRUCTURING—THEORY AND EVIDENCE

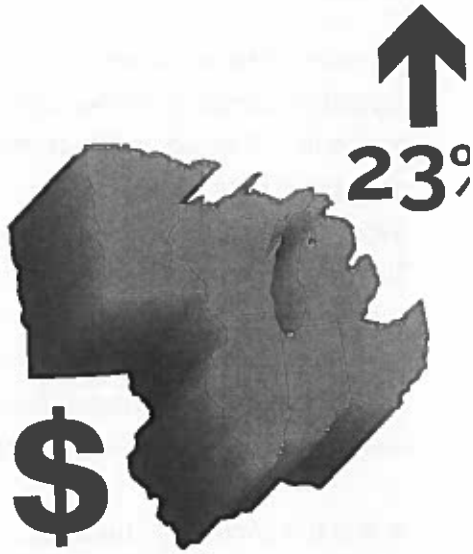
There have been several studies looking in particular at the effects of structural change and increased competition in the electric utility industry. An early paper (2000) by the Organization for Economic Cooperation and Development looked at 19 OECD countries over a 10-year period and noted that "the primary findings are that while changes in legal rules may be slow to translate into changes in conduct, unbundling of generation, private ownership, expanded access to transmission networks, and the introduction of electricity markets impact the performance measures in a statistically significant way."[18]

The authors of a 2007 paper published in *American Economic Review* found that municipally-owned plants, whose owners were for the most part unaffected by restructuring, experienced the smallest efficiency gains over the past decade. Investor-owned utility plants in states that restructured their wholesale electricity markets had the largest reductions in non-fuel operating expenses and employment, while investor-owned plants in non-restructuring states fell between these extremes.[19]

A 2005 study by the University of California Energy Institute looked at generating plants that had been divested from regulated monopolies between 1998 and 2001. The authors found that following divestiture, plants improved their efficiency by 2% and that the change in the incentive structure was the primary driver of the increased efficiency.[20]

In papers published in 2007 and 2008, Michael Pollitt found, based on the UK experience, that ***competition reduces costs (and prices) significantly, relative to what they might have been without reform.***[21]

In 2013, Theodore Bolema analyzed the effects of changes in the regulation of utilities due to the 2000 Michigan legislation introducing consumer choice and the 2008 legislation that substantially limited choice. He found that prior to the introduction of choice, Michigan's electricity prices were well above the national and regional averages; within two years of choice implementation, the state's rates were below the national average and closing in on the regional average. ***After the 10% cap on choice was imposed in 2008, rates in Michigan once more moved above the national average and rose faster than neighboring states so that by the end of 2012 rates were 18% above the national average and 23% above the regional average.***[22]



In 2015, a paper by COMPETE noted that, among other things, the examination of five states of the Industrial Upper Midwest "offer[s] a compelling intra-regional example of the success of Customer Choice, with the competitive states Illinois and Ohio outperforming the Monopoly States of Indiana, Michigan and Wisconsin with lower price trends and greater generation efficiency"[23]

Again, it should not be surprising that ***removing barriers to entry and allowing access to customers will improve economic efficiency and drive innovation.***

TRANSITION ISSUES

There are a few issues with making the transition from a regulated monopoly industrial structure to one where structural separation overcomes the disincentives to innovation and efficient production. Among these are: 1) given current technology, distribution remains a natural monopoly (it is most efficient to have only one set of power lines), 2) the mechanics of how investor-owned utilities would structurally separate, and 3) what to do about so-called "stranded costs" (long-term investments already made by utilities under the assumption the current system would continue).

It is quite possible that the distribution network will become decentralized once structural separation takes place and all forms of generation have full incentives to innovate. *The Economist* recently reported that 600,000 households in Africa use off-the-grid solar power.[24] However, it is likely that distribution in Michigan will remain a natural monopoly for the foreseeable future. ***Thus, the Michigan Public Service Commission will need to regulate distribution rates after structural separation to overcome the inefficiencies caused by a monopoly provider.***

Structural separation of transmission proceeded rather smoothly, albeit over an extended time, the state can ensure a smooth transition to separating generation from distribution as well in a few ways. One way of accomplishing structural separation of generation and distribution might be to allow the investor-owned utilities to set up a separately owned subsidiary and require that this subsidiary be sold after a certain period. One may also look to the experiences of other states that have managed structural separation, such as Rhode Island and Texas.[25]

Stranded costs result when a regulated monopoly utility invests in generation facilities under a current set of regulations and then these regulations are changed, resulting in potential decline in the demand for that utility's generation. This argument has been at the forefront of the debate over Michigan's attempts at deregulation. For example, investor-owned utilities argued, when the 2000 legislation was being debated, that they had constructed generating facilities that would become unprofitable once retail competition began and their customer base shrunk. This could possibly result in bankruptcy.

The solution at the time, and in other states such as Ohio, was to allow utilities to collect a fee from every customer using their distribution networks to reimburse them for the stranded costs. As part of this, Act 141 allowed the investor-owned utilities to securitize $2.2 billion in stranded costs with an assessment placed on the customer.

Within the context of structural separation, utilities may argue that, when sold to another entity, the market value of their generating facilities will be lower than they are under the current regulatory system. Aside from whether stranded costs should be reimbursed, the mechanics of reimbursement, as well as determining what these costs might be, will have to be addressed.

CONCLUSION

While the electric utility industry developed as a regulated monopoly in the nineteenth century, technological advances in the hundred or so years since its inception have made it possible to gain the advantage of competition through access to customers.

Michigan already began dismantling the state's vertically integrated electric monopolies when it separated the ownership of transmission from energy production and distribution. Further deregulation of Michigan's electricity market now offers the opportunity for improved efficiency in the production of electricity. Perhaps more importantly, deregulation will encourage innovation in the energy sector, particularly for clean and renewable energy—which has been growing in popularity as its cost falls. ***Successful accomplishment of this will require the structural separation of generation from distribution by Michigan's investor-owned utilities.***

Michigan's electric utility model is outdated and inefficient, resulting in high rates and few choices for residents. ***Structural separation will help Michigan and its energy markets reap benefits in the forms of less regulation, more consumer choice, and jobs and investments in the state.***

While there may be some transition issues with structural separation, its additional benefits can outweigh the costs. In sum:

1. By separating generation from distribution, the state can **achieve a level playing field for all electricity generators**, without subsidies that pick winners and losers.
2. Structural separation and opening access to markets will allow further **development of third party ownership** of energy generation. In turn, the state will **attract investments and jobs** as more companies seek to put down roots in Michigan.
3. Consumers will have more choices for how they get their electricity. **With more competition comes more innovation and lower prices**, allowing families to adjust their household budgets to spend less on electricity bills.
4. Similarly, electricity bills are often the highest cost for industrial and manufacturing companies, who in turn pass these costs onto consumers. Structural separation will allow for greater efficiency and innovation in the energy sector, reducing rates for families and businesses alike. **With lower energy costs, industrial companies can improve their bottom line and invest more in their employees.**
5. As we move from a regulated monopoly utility model to one of increased competition and market access, **there will be less need for regulations** – resulting in less government intervention in Michigan energy markets.
6. Structural separation can also **encourage innovation in our state's transition to smart and micro grid technology**, further accelerating and transforming the way we use and track our energy consumption.

SOURCES

1 F.A. Hayek, "The Meaning of Competition," in *Individualism and Economic Order* (University of Chicago, 1948)

2 See *Powering the Past: A Look Back*, Smithsonian Institution, 2002 http://americanhistory.si.edu/powering/thepast.htm

3 See David Tuttle, *et al*, *The History and Evolution of the U.S. Electricity Industry*, White Paper UTEI/2016-05-2, 2016, available at http://sites.utexas.edu/energyinstitute/files/2016/09/UTAustin_FCe_History_2016.pdf

4 *Public Control and Private Operation*, Samuel Insull, Speech before the National Electric Light Association (now Edison Electric Institute), Chicago, Illinois, June 7, 1898, available at http://bit.ly/2uZQgol

5 See *Restructuring: The Effects of FERC Orders 888, 889, and 2000*, Transmissives, available at http://bit.ly/2wcanII

6 Gary Wolfram, Improving Michigan's Electric Utility Industry, Michigan Conservative Energy Forum, 2015, available at http://bit.ly/2wbA1NY

7 See also Hayek's "Competition as a Discovery Procedure," in Chiakai Nishiyama and Kurt Leube (ed), *The Essence of Hayek* (Hoover Institution Press, 1984), pp. 254-265.

8 "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science*, no. 3, pp. 3–18.

9 The same would be true of innovations in distributed energy resource systems.

10 Adam Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations*, Volume 1 (Liberty Classics, 1981 (1776)), pp. 26-27.

11 89 FERC ¶ 61,285 UNITED STATES OF AMERICA, FEDERAL ENERGY REGULATORY COMMISSION 18 CFR Part 35 [Docket No. RM99-2-000, Order No. 2000] Regional Transmission Organizations (Issued December 20, 1999), p. 1

12 A useful summary of PA 141 is in *Electricity Restructuring in Michigan: The Effects to Date on PA 141 and Potential Future Challenges*, Public Sector Consultants, 2006

13 http://www.itc-holdings.com/itc/about-us

14 http://www.michigan.gov/documents/mpsc/electricdata_594998_7.pdf

15 N. Rosenberg and L.E. Birdzell, Jr., *How The West Grew Rich* (Basic Books, 1986)

16 M. Morey and L. Kirsch, *Retail Choice in Electricity: What Have We Learned in 20 Years?*, Christensen Associates Energy Consulting, 2016

17 MCL 460.1033(b) was repealed by PA 342.

18 Faye Steiner, *Regulations, Industry Structure and Performance in the Electricity Supply Industry, Office for Economic Co-operation and Development*, Economics Department Working Papers No. 238 (2000), p. 2.

19 Fabrizio, Rose and Wolfram, "Do Markets Reduce Costs? Assessing the Impact of Regulatory Restructuring on US Electric Generation Efficiency," *American Economic Review*, Volume 97, No. 4, September 2007, pp. 1250-1277.

20 J. Bushnell and C. Wolfram, *Ownership Change, Incentives and Plant Efficiency: The Divestiture of U.S. Electric Generation Plants*, Center for the Study of U.S. Energy Markets, University of California, 2005

21 Pollitt, M., 'Liberalisation and regulation in Electricity Systems: How Can We Get the Balance Right?', Cambridge Working Papers in Economics No. 0724, Faculty of Economics, University of Cambridge (2007), and Pollitt, M., 'The Future of Electricity (and Gas) Regulation', Cambridge Working Papers in Economics No. 0819, Faculty of Economics, University of Cambridge (2008)

22 Theodore Bolema, *Electricity Choice Policies in Michigan: Comment On "Readying Michigan to Make Good Energy Decisions,"* Policy Brief, Mackinac Center for Public Policy, Nov. 1, 2013 S2013-09

23 Phillip O'Connor and Erin O'Connell-Diaz, *Evolution of the Revolution: The Sustained Success of Retail Electricity Competition*, COMPETE, July 2015 available at https://sites.hks.harvard.edu/hepg/Papers/2015/Massey_Evolution%20of%20Revolution.pdf

24 *The Economist*, October 29, 2016, "Africa Unplugged," http://econ.st/2uEcQLL

25 See, for example, *Electric Restructuring in New England: A Look Back*, Reishus Consulting, LLC, http://bit.ly/2uflCoE

For additional copies of this report:
Michigan Conservative Energy Forum
www.micef.org